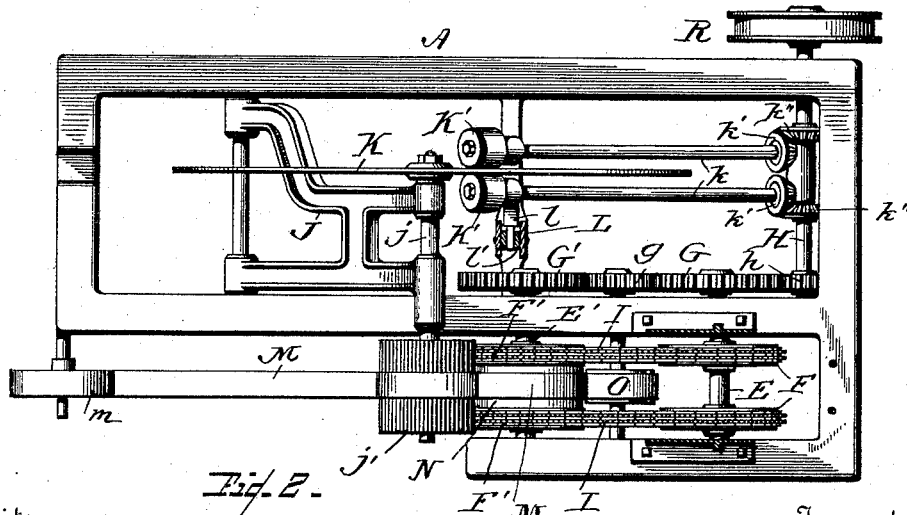


3 Sheets—Sheet 1.

No. 489,752.

Patented Jan. 10, 1893.



Witnesses
"H. H. Henders,
A. M. Mace

Inventors
Martin Moul,
Edwin G. Quichel.

By their Attorney

Albert Speiden.

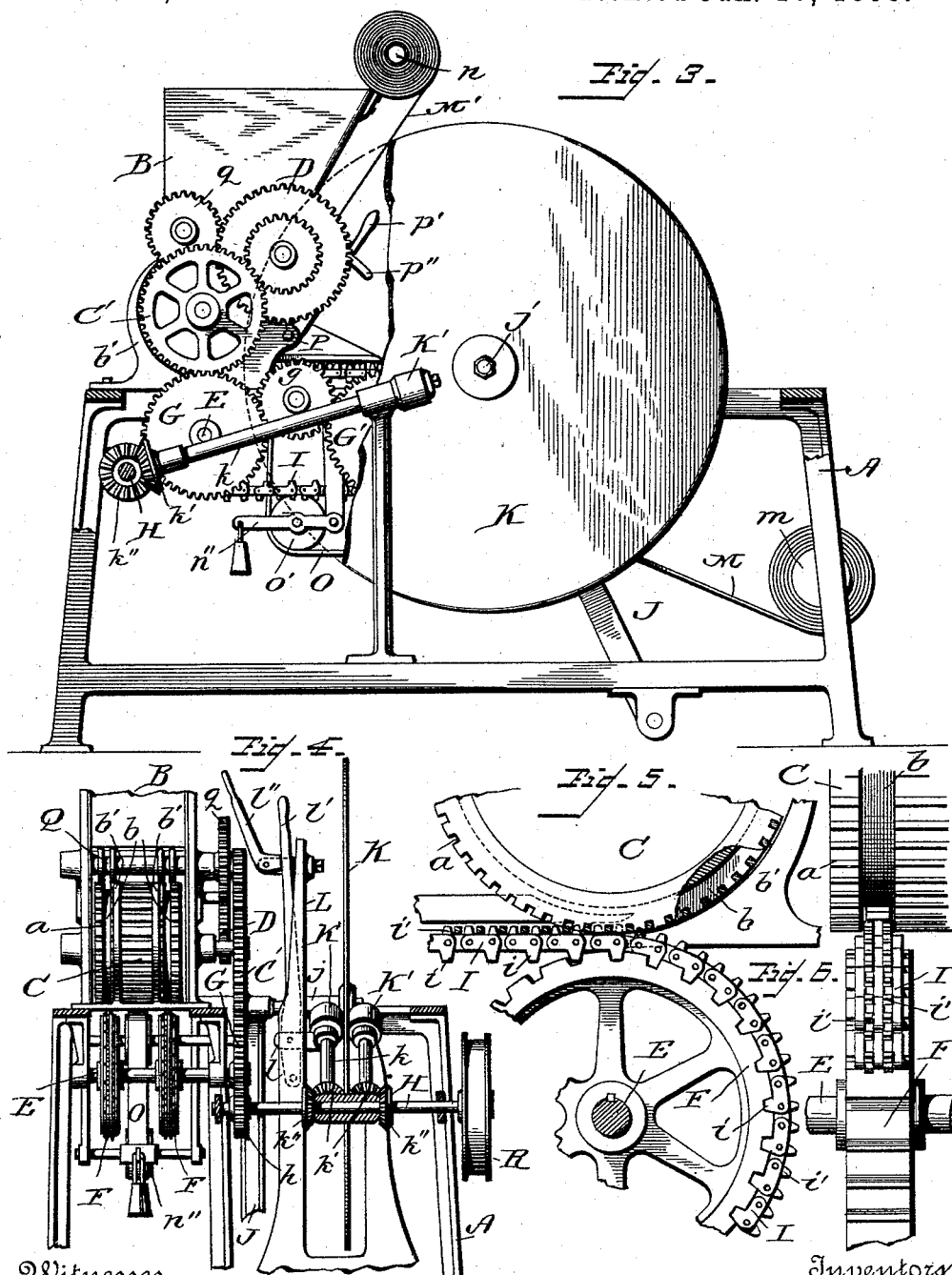
(No Model.)

3 Sheets—Sheet 2.

M. MOUL & E. G. QUICKEL.
MACHINE FOR BUNCHING MATCH STICKS.

No. 489,752.

Patented Jan. 10, 1893.



Witnesses
W. H. Spiden.
A. M. Mace

Inventors
Martin Moul.
Edwin G. Quickel.
By their Attorney
Albert Spiden.

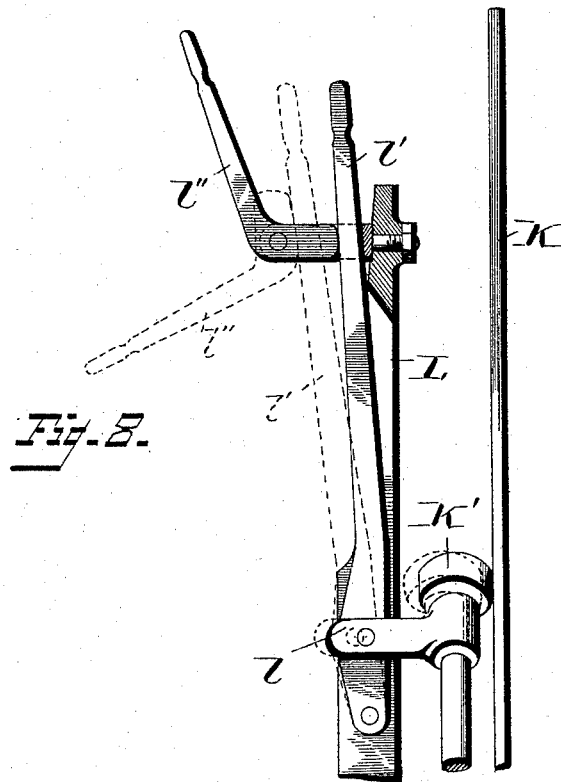
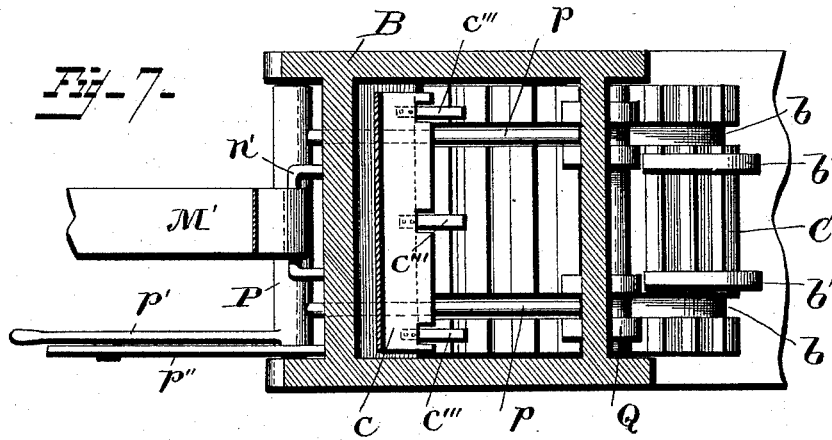
(No Model.)

3 Sheets—Sheet 3.

M. MOUL & E. G. QUICKEL.
MACHINE FOR BUNCHING MATCH STICKS.

No. 489,752.

Patented Jan. 10, 1893.



Witnesses
A. M. Mace

Inventors
Martin Moul.
Edwin G. Quickel.
By Attorney
Albert Speiden.

UNITED STATES PATENT OFFICE.

MARTIN MOUL, OF HANOVER, AND EDWIN G. QUICKEL, OF YORK,
PENNSYLVANIA.

MACHINE FOR BUNCHING MATCH-STICKS.

SPECIFICATION forming part of Letters Patent No. 489,752, dated January 10, 1893.

Application filed June 18, 1892. Serial No. 437,126. (No model.)

To all whom it may concern:

Be it known that we, MARTIN MOUL, residing at Hanover, and EDWIN G. QUICKEL, residing at York, in the county of York, State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Machines for Bunching Match-Sticks; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to certain new and useful improvements in machines for bunching match sticks, and has for its object, broadly, to produce a machine which will place the sticks or splints between tapes or webbing, and wind the same into rolls ready for dipping.

The invention further consists in means for preventing the feed of sticks from the hopper without the necessity of stopping the whole machine.

A further object is to give a positive feed to the roll of sticks, and to cause the same to run slower as it increases in diameter, thus keeping the same tension on the roll throughout its winding.

The invention further consists in certain details of construction and combinations of parts all as more fully hereinafter described, shown in the drawings and then pointed out in the claims.

In the accompanying drawings—Figure 1, is a longitudinal section of a machine constructed in accordance with our invention. Fig. 2, is a plan view of the machine, with the hopper and feed roller removed. Fig. 3, is a side elevation on the opposite side from that shown in Fig. 1. Fig. 4, is an end elevation partly in section. Fig. 5, is an enlarged side elevation of a portion of the feed-roller and the feed-chain. Fig. 6, is an edge view of the same. Fig. 7 is a sectional view through the bottom of the hopper, on an enlarged scale. Fig. 8 is an enlarged view of the levers for throwing the friction-wheel into and out of contact with the friction-disk, showing their operation in dotted lines.

Referring to the details of the drawings—A, designates the frame of the machine, upon which is mounted a hopper B. In the lower

end of this hopper and forming the bottom thereof is mounted a revolving drum or feed roller C, the surface of which is serrated or fluted as at *a* for the reception of the sticks. This roller is revolved by a gear-wheel C'. Grooves *b* are formed in the feed-roller C for a purpose which will hereinafter appear. In order to prevent the hopper from becoming choked an agitator is provided which consists of a plate *c* constructed preferably of spring metal secured at its upper end to the inner face of the hopper, its lower end reaching to within a slight distance of the feed-roller. A shoe *c'* secured to the rear face of the plate *c* is engaged through a slot in the hopper by a toothed-wheel *c''*, which is revolved by a gear-wheel D. Guards *c'''* hold the sticks when plate *c* springs back. For further agitation and also to keep the sticks straight, a plate *d*, pivoted as at *d'* to the sides of the hopper, is connected with the plate *c* by a short link *d''*; thus it will be seen that upon the revolution of the toothed wheel *c''*, its teeth working upon the shoe *c'* will cause the plate *c* to vibrate, and, through the medium of link *d''* will vibrate plate *d*, thus producing a thorough agitation of sticks or splints and insures the filling of every serration in the feed-wheel. A finger or shield *b'* prevents the sticks after leaving the hopper, falling from the feed-roller.

Mounted upon shafts E, E', are sprocket-wheels F, F', shaft E receiving motion from the gear G which meshes with the pinion *h*, on the driving-shaft H, of the machine, and through the intermediate pinion *g*, transmits motion to the gear G' on shaft E'. Connecting sprocket-wheels F, F', are the conveyer chains I, said chains being provided on their under faces with teeth *i*, which mesh with the wheels, and upon their upper faces with projections or lugs *i'*, said lugs being so spaced that as the feed-wheel and the feed-chains work in unison, a stick will be deposited in every space between the lugs, as shown most clearly in Fig. 5.

Mounted in the upper end of a swinging frame J, is a shaft *j*, said shaft carrying on one end the friction-disk K, while its other end is fitted to receive a spool *j'*, upon which the sticks are wound. On both sides of the

disk K, and in contact therewith, are the friction-wheels K', said wheels being mounted on the upper ends of shafts k , the lower ends of said shafts carrying each a bevel pinion k' which mesh with similar pinions k'' on the driving-shaft H. Projecting laterally from the upper bearing of one of the shafts k is an arm l , which projects through a slot in an upright L and is pivoted to a lever l' , the upper end of said lever being controlled by a cam-lever l'' secured to the upper end of the upright L, as most clearly shown in Fig. 8.

A web M, which is fed from a suitable spool m , passes up and around a friction roller N mounted on the shaft E' and thence under the sticks to the spool j' . A tape M' from a spool n passes down through a bail n' and thence over the sticks to the spool j' , by which it will be seen that the sticks are tightly wound between the web and the tape. In order to prevent the tape carried by the spool n from unwinding faster than necessary, a band-brake is employed, which consists of a strap m^2 , one end of which is secured to a fixed portion of the hopper, and bears upon a smooth portion of the spool n , a weight m' carried by the free end of the strap serving to keep it under the desired tension.

A belt O carried by pulleys o , o' , and o'' bears upon the web M and holds it firmly against the roller N, thus forming a pressure device which insures the web traveling at precisely the same rate of speed as the sticks on the chain. This belt is kept at the proper tension by mounting the pulley o' on a weighted lever n'' .

It may sometimes be necessary to stop the feed of sticks from the hopper without stopping the entire machine. This is accomplished in the following manner: A short shaft P, suitably mounted, carries arms p ; these arms extend across the bottom of the hopper and rest in the grooves b in the feed roller C, as seen in Fig. 1. When it is desired to stop the feed, lever p' is drawn back which rocks the shaft P and raising the arms p , lifts the sticks and prevents their entering the notches in the feed-roller. A gravity rack-bar p'' engages the lever p' and holds the arms p in this raised position.

A roller Q, journaled at the lower edge of the hopper is revolved by a gear-wheel q , and prevents the sticks from binding as they leave the hopper on the feed-roller.

A pulley R, secured to the end of the drive-shaft H, receives a belt from any suitable source of power.

The operation of the machine is as follows:—The machine being set in motion, the sticks will be fed from the hopper by the feed-roller onto the feed-chain, and by the feed-chain to the winding spool on which they are wound between the web and the tape. As the roll of sticks becomes larger and the swinging frame moves outward, as shown in dotted lines in Fig. 1, the friction wheels gradually impinge upon the friction-disk fur-

ther from its center and consequently drive it slower, thus always winding the sticks at the same rate of speed and tension. When the roll of sticks is removed and it is desired to return the swinging-frame and friction-disk to their former position, it is simply necessary to throw back the cam-lever l'' , which will release lever l' and cause the rollers to release their frictional hold on the disk. Thus it will be seen that the disk can be moved forward without the necessity of forcing it against the frictional contact of the rollers.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is—

1. In a machine for bunching match-sticks, a hopper, a serrated feed-roller mounted below the same, and a conveyer-chain contiguous to the feed-roller in combination with a positively actuated frictionally controlled spool, and rollers bearing respectively a web and a tape designed to be wound upon the spool.

2. In a machine for bunching match-sticks, a hopper, a serrated feed-roller mounted below and forming the bottom of the hopper, and a conveyer-chain contiguous to the feed-roller in combination with a positively actuated frictionally controlled spool, rollers bearing respectively a web and a tape designed to be wound upon the spool, and a pressure-device coacting with the web.

3. In a machine for bunching match-sticks, a hopper having an agitator therein, a feed-roller mounted below the hopper, and a conveyer-chain coacting with the said roller, in combination with a positively actuated frictionally controlled spool, and rollers bearing respectively a web and a tape designed to be wound upon the spool.

4. In a machine for bunching match-sticks, a hopper having a continuously vibrated agitator therein, a feed-roller below the hopper having transverse grooves in its periphery, and a conveyer-chain, in combination with a feed stop coacting with the feed-roller for checking the passage of the sticks to the said chain, and a lever for actuating the said check at any point during the operation of bunching.

5. In a machine for bunching match-sticks, the combination, with a hopper, a feed-roller, and a conveyer-chain, of a swinging-frame carrying a shaft bearing a spool and a disk, and mechanism for imparting motion to the disk.

6. In a machine for bunching match-sticks, the combination with a hopper, a feed-roller and a conveyer-chain, of a swinging-frame carrying a shaft bearing a spool and a disk, a friction roller bearing against each side of the disk, and mechanism for imparting motion to the said rollers independent of the disk.

7. In a machine for bunching match-sticks, the combination with a hopper, a feed-roller, and a conveyer-chain, of a swinging-frame

carrying a shaft bearing a spool and a disk, a positively actuated friction-roller bearing against each side of the disk to impart motion thereto, and a lever for throwing one of the friction rollers out of contact with the disk, whereby to admit of the said frame being swung to or from the rollers.

8. In a machine for bunching match-sticks, the combination with a hopper and a feed-roller mounted below the same, of a series of shafts bearing each a series of sprocket-wheels, sprocket-chains uniting the said wheels and coacting with the feed-roller, a friction-roller mounted on one of the shafts, a swinging-shaft carrying a spool at one end and at the other end a revoluble disk, and rollers bearing respectively a web and a tape, said web being designed to contact with the friction-roller, whereby to press the sticks

tightly against the tape in being wound upon the spool. 20

9. In a machine for bunching match-sticks, a hopper, a feed-roller, and a bunching-spool, in combination with a plurality of sprocket-wheels located below the feed-roller and having peripheral indentations, and sprocket-chains having on one side projections engaging the said indentations, and on the opposite side like projections for feeding the sticks from the feed-roller to the bunching-spool. 25 30

In testimony whereof we affix our signatures in presence of two witnesses.

MARTIN MOUL.
EDWIN G. QUICKEL.

Witnesses:

H. E. POWELL,
JACOB E. WEAVER.